

REMARKS

By the present amendment, claims 18, 25, and 36 have been amended. Allowable claim 23 has been rewritten as new independent claim 46 which includes all of the limitations of the base claim and any intervening claims. Allowable claim 41 has been rewritten as new independent claim 47 which includes all of the limitations of the base claim and any intervening claims. Reconsideration and allowance of outstanding claims 18-45 in view of the above amendments and following remarks are requested.

A. Rejections of Claims 18-22, 24-40, and 42-45 under 35 USC §103(a)

The Examiner has rejected claims 18-45 under 35 USC §103(a) as being obvious with respect to alleged Applicant's "admitted prior art." For the reasons discussed below, Applicant respectfully traverses the rejection. Applicant submits that the present invention, as defined by amended independent claims 18, 25, and 36, is allowable.

Referring to the present application, independent control of polycrystalline silicon-germanium in an HBT is disclosed. Independent claims 18 recites, among other things, a base comprising kinetically controlled growth mode single crystal silicon-germanium and a base contact comprising mass controlled growth mode polycrystalline silicon-germanium. The base and base contact are both grown at a first pressure and a first temperature. Independent claims 25 and 36 contain similar limitations.

Consequently, at lower temperatures (e.g. 650° C), embodiments according to the present invention advantageously achieve growth of a polycrystalline silicon-germanium

base contact without causing a substantial growth in the single crystal silicon-germanium base.

Furthermore, for precursor gas flow rates in an appropriate range, such as for example between approximately 100.0 standard cubic centimeters (SCCM) and approximately 400.0 SCCM, the epitaxial growth rates for the single crystal silicon-germanium are not significantly affected, while the polycrystalline growth rates vary substantially linearly as a function of the precursor gas flow volume. Thus, the present invention advantageously achieves control over the ratio of polycrystalline silicon-germanium base contact deposition rate to single crystal silicon-germanium base deposition rate.

Desired control is thus achieved over the thickness of the deposition and also the structure in terms of how much of the deposition is polycrystalline and how much is amorphous or unstructured deposition. It follows that a lower base contact resistance can be advantageously achieved by increasing the thickness of the polycrystalline silicon-germanium. Further, the crystal structure of the base is advantageously improved by increasing the proportion of polycrystalline material over amorphous.

The Examiner states that the present application, at pages 2-5, teaches a structure comprising a base comprising a single crystal silicon-germanium, and a base contact comprising polysilicon. Applicant respectfully submits that pages 2-5 of the present application do not disclose, teach, or even suggest a base comprising kinetically controlled growth mode single crystal silicon-germanium, and a base contact comprising

mass controlled growth mode polycrystalline silicon-germanium, wherein the base and base contact are grown at a first temperature and a first pressure of a precursor gas, as recited in amended independent claim 18. Similar limitations also appear in independent claims 25 and 36 and are not disclosed, taught, or, suggested in pages 2-5 of the present application.

Additionally, independent claims 18, 25, and 36 have been amended to include language indicating that the base contact and said base are characterized by a controlled deposition ratio. Support for these amendments appears in the present application, pages 23 and 24, and does not appear in pages 2-5 of the present application.

For the foregoing reasons, Applicant respectfully submits that the present invention as defined by amended independent claims 18, 25, and 36 is patentable. As such, the claims depending from amended independent claims 18, 25, and 36 are, *a fortiori*, also patentable for at least the reasons presented above and also for additional limitations contained in each dependent claim.

B. Allowable Subject Matter

The Examiner has objected to claims 23 and 41 as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, allowable claim 23 has been rewritten as new independent claim 46 which includes all of the limitations of the base claim and any intervening claims. Allowable claim 41 has been rewritten as new

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independent claim 47 which includes all of the limitations of the base claim and any intervening claims. Thus, new claims 46 and 47 have been added, which are allowable according to the Examiner's comments in the Office Action.

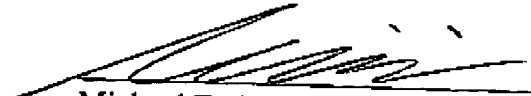
C. Conclusion

Based on the foregoing reasons, the present invention, as defined by amended independent claims 18, 25, and 36, and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, outstanding claims 18-45 are patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, an early allowance of outstanding claims 18-45, and an early Notice of Allowance directed to all claims 18-47 remaining in the present application are respectfully requested.

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Respectfully Submitted,
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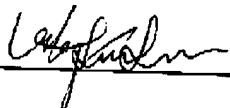
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